CIMSS support of Imagery EDR team and Other JPSS Activities

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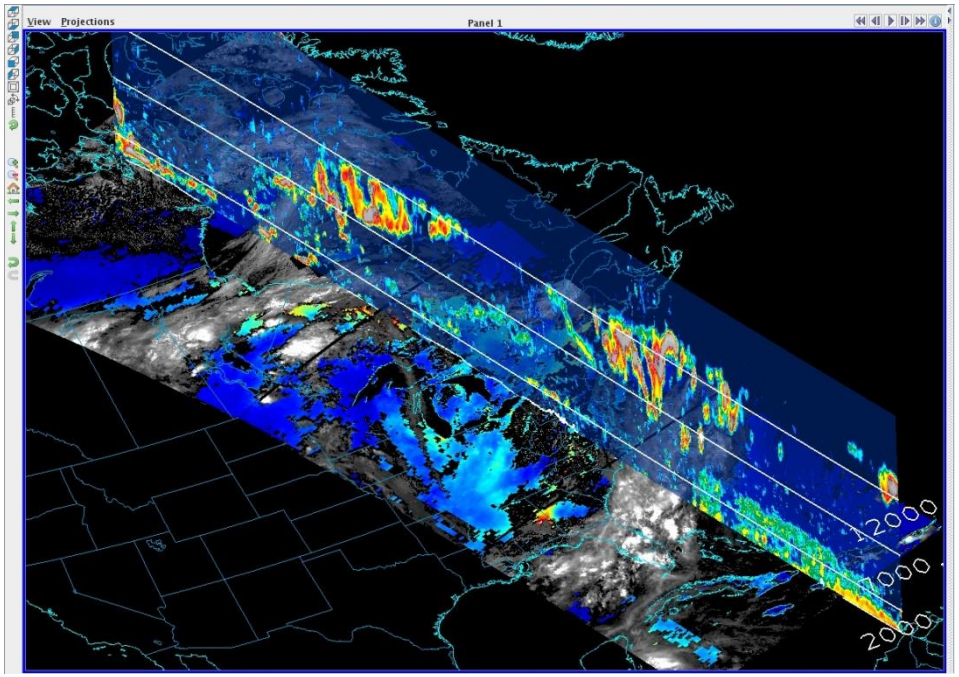
Outline

- Overview of McIDAS-V
- Examples
- McIDAS-V summary
- Other work

What is McIDAS-V

McIDAS-X → VisAD + IDV + HYDRA =

- **Integration of Geophysical Data**
- **Remote and Local Data Access**
- **Powerful Analysis Tools**
- **3D Visualization**
- **Ease of Re-projection**



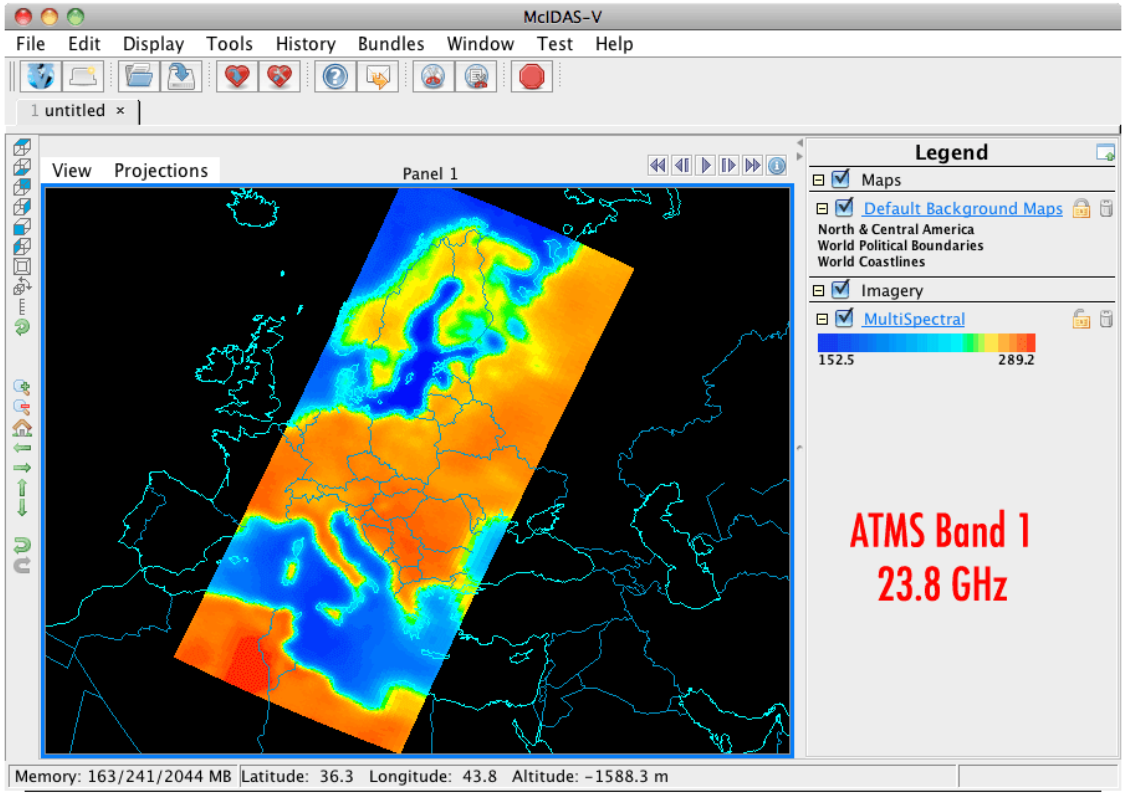
Key Aspects of McIDAS-V

- **Built on top an extensible framework for adapting new sources of data (format and type, local or remote), user interface components and for creating novel displays and analysis techniques**
- **Developed in the Java programming language – object oriented, write once run anywhere, very portable**
- **Persistence mechanism (bundles) for saving and sharing interesting displays/analysis with other McIDAS-V users**
- **Python based user defined computation**
- **Open source, freely available, community driven software**
- **Is able to easily load and manipulate Suomi NPP (Block 1 and 2) and JPSS-1 simulated Block 2 data without any special readers**

- It has 5 instruments which retrieve data regarding the atmosphere, land and ocean. 3 of these instruments can be displayed in McIDAS-V
  - VIIRS
  - CERES
  - CrIS
  - ATMS
  - OMPS* (in testing)

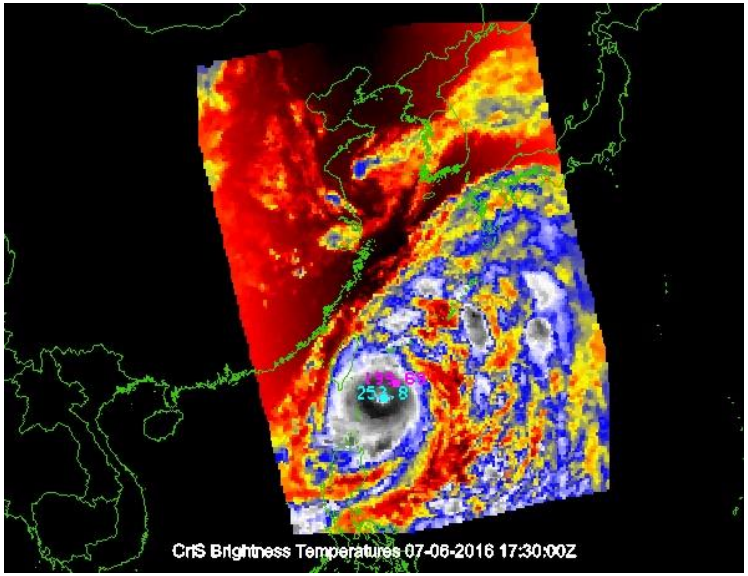
Advanced Technology Microwave Sounder (ATMS)

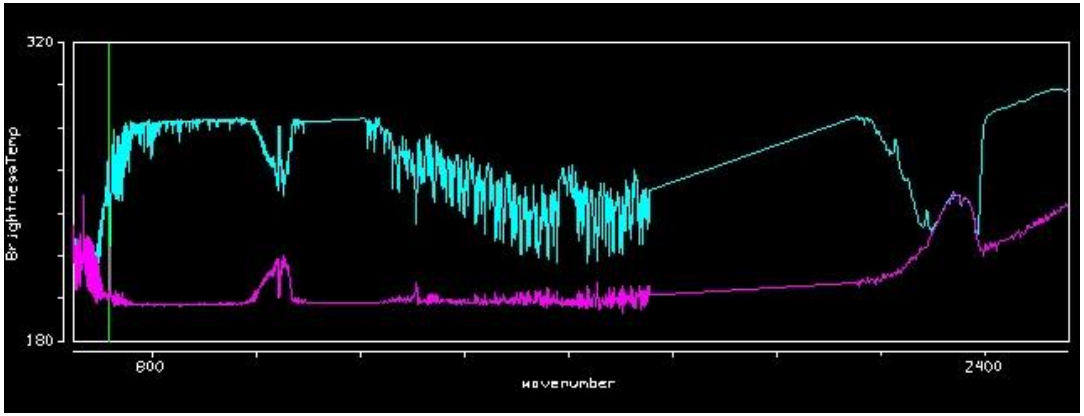
- 22 microwave channels, combining all the channels of the preceding AMSU-A1, AMSU-A2, and AMSU-B sensors into a single package
- Provides sounding observations needed to retrieve profiles of atmospheric temperature and moisture for forecasting models and continuity for climate monitoring purposes.



Cross-track Infrared Sounder (CrIS)

- 1,305 infrared spectral channels
- Designed to provide high vertical resolution information on the atmosphere's structure of temperature and water vapor.

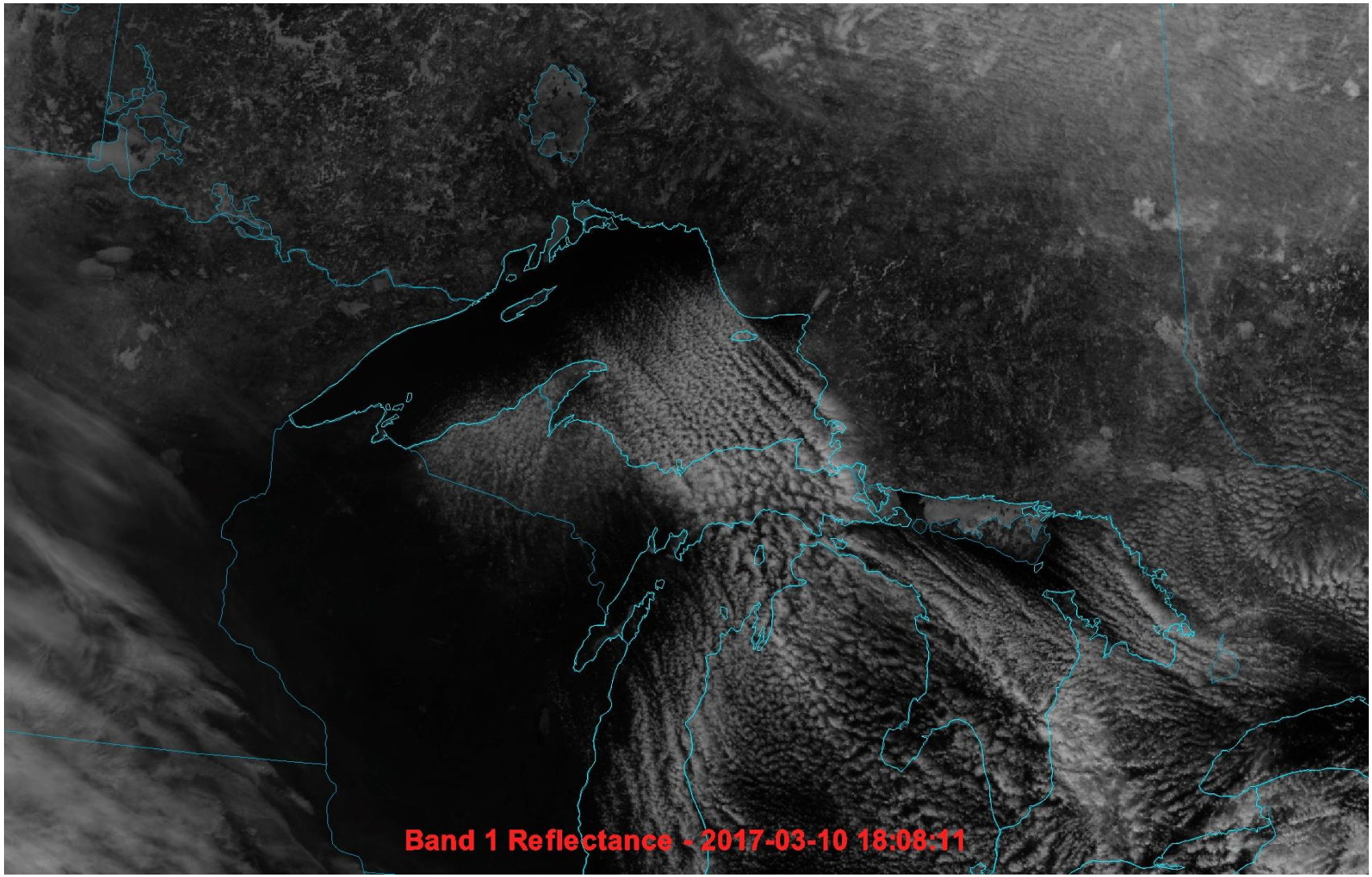




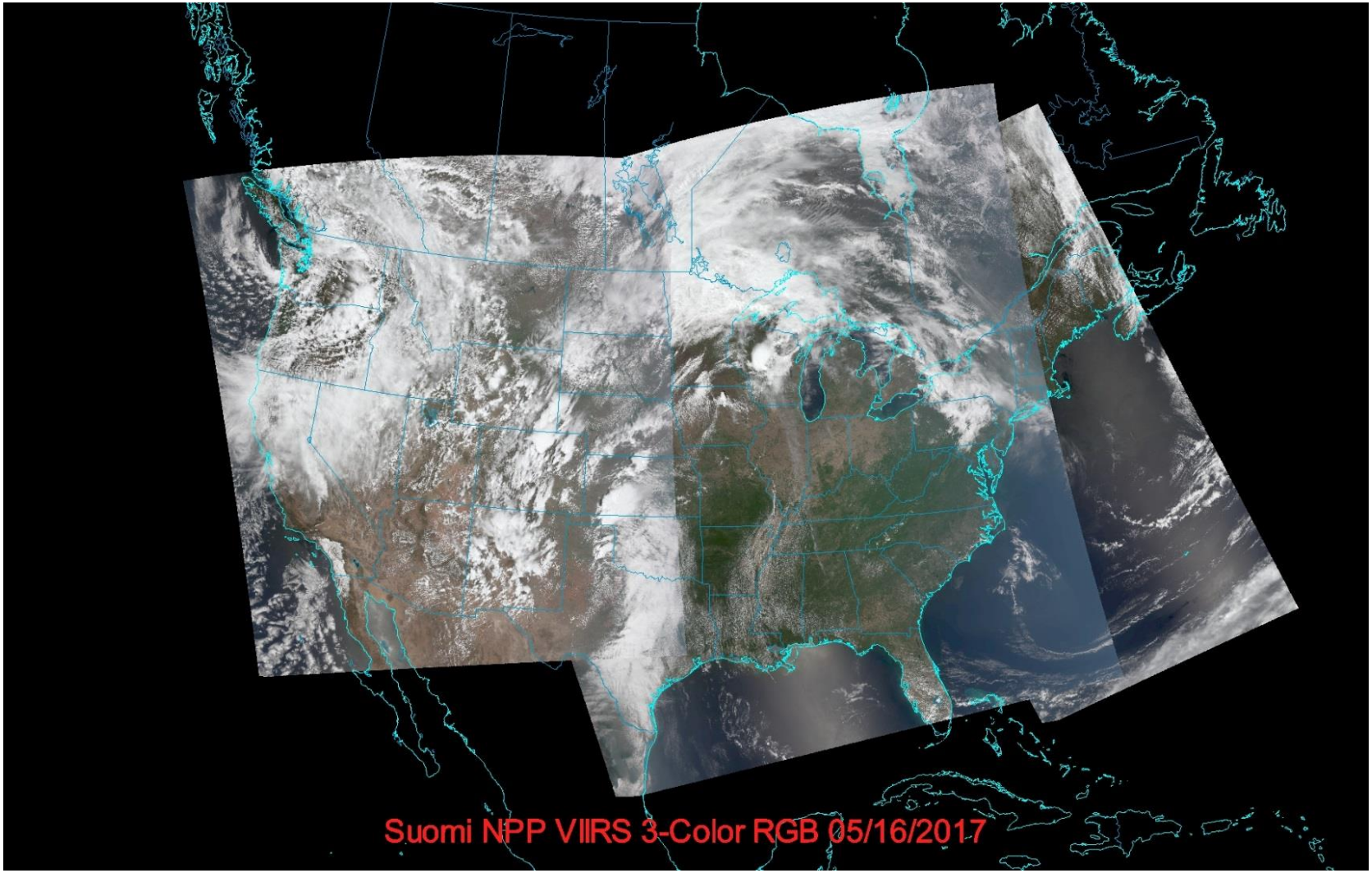
Visible Infrared Imaging Radiometer Suite (VIIRS)

- Has 22 channels at three different resolutions
  - 16 Moderate Band (M-Band) channels (~750 m at nadir)
  - 5 high resolution (I-Band) channels (~375 m at nadir)
  - Day Night Band (~750 m at nadir)
- M and I band data encompass data from 412 nm to 12 µm
- Used to produce Level 2 products

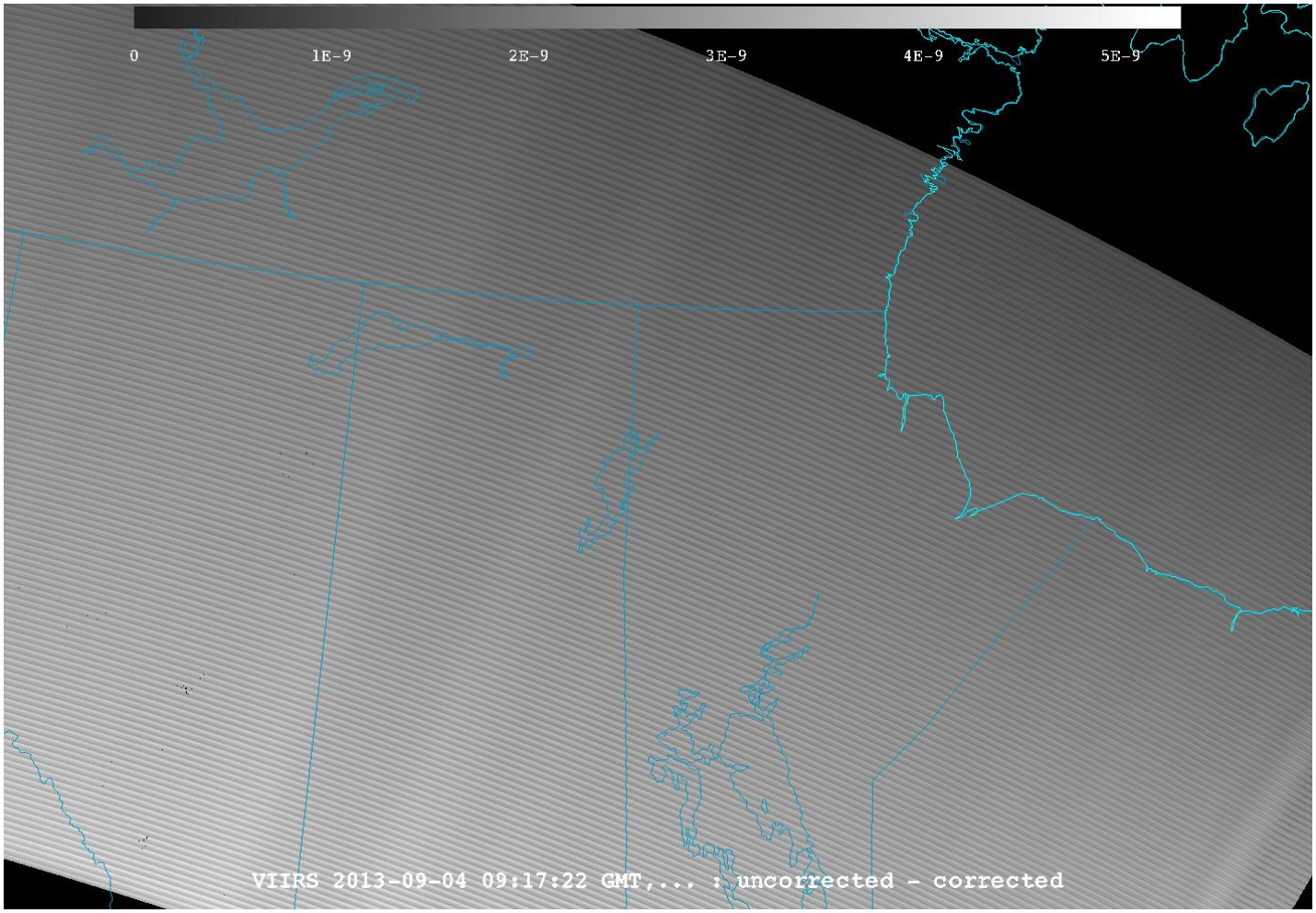
Multi-channel animation



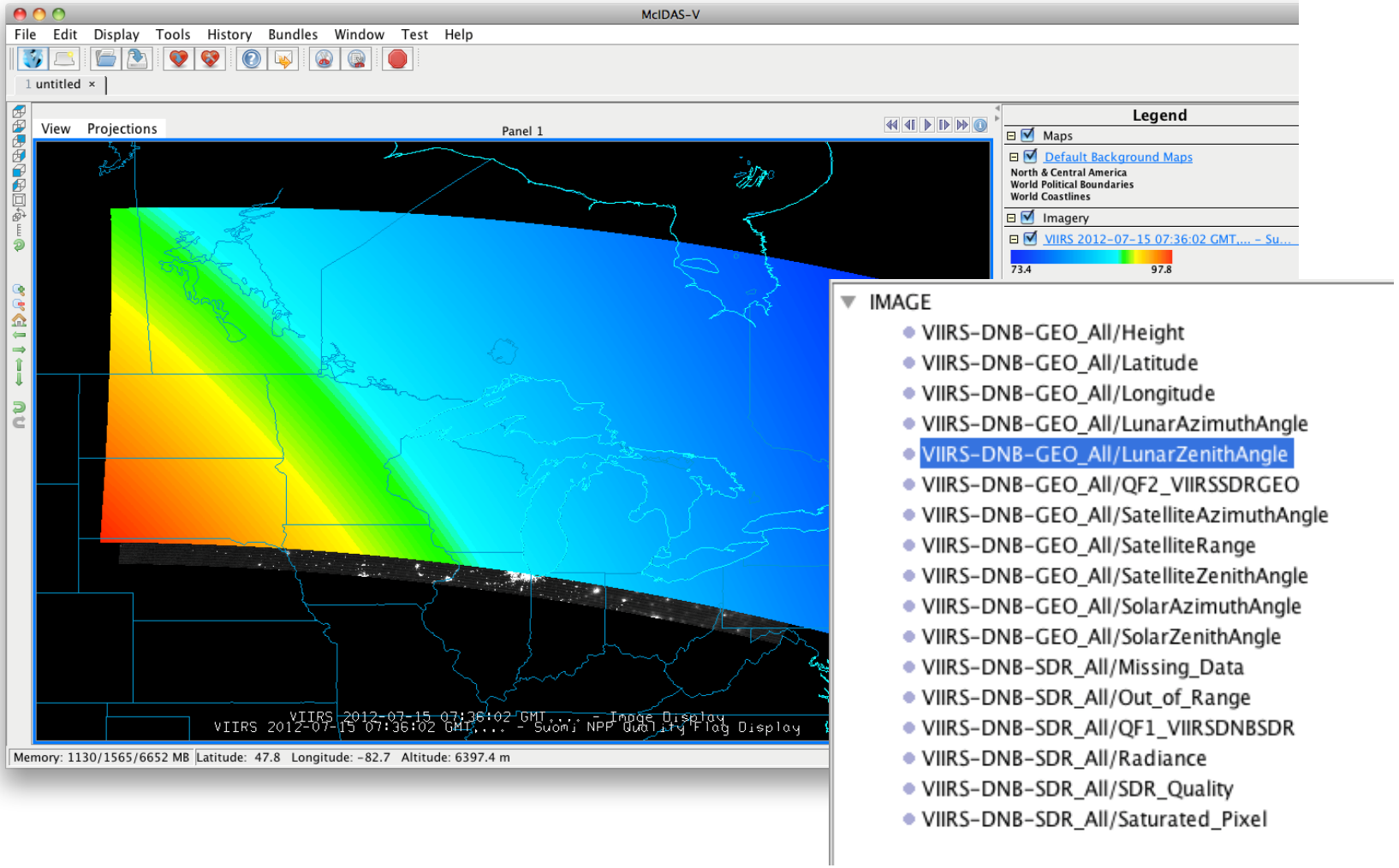
RGB composite



VIIRS Channel Differencing DNB Stray light example



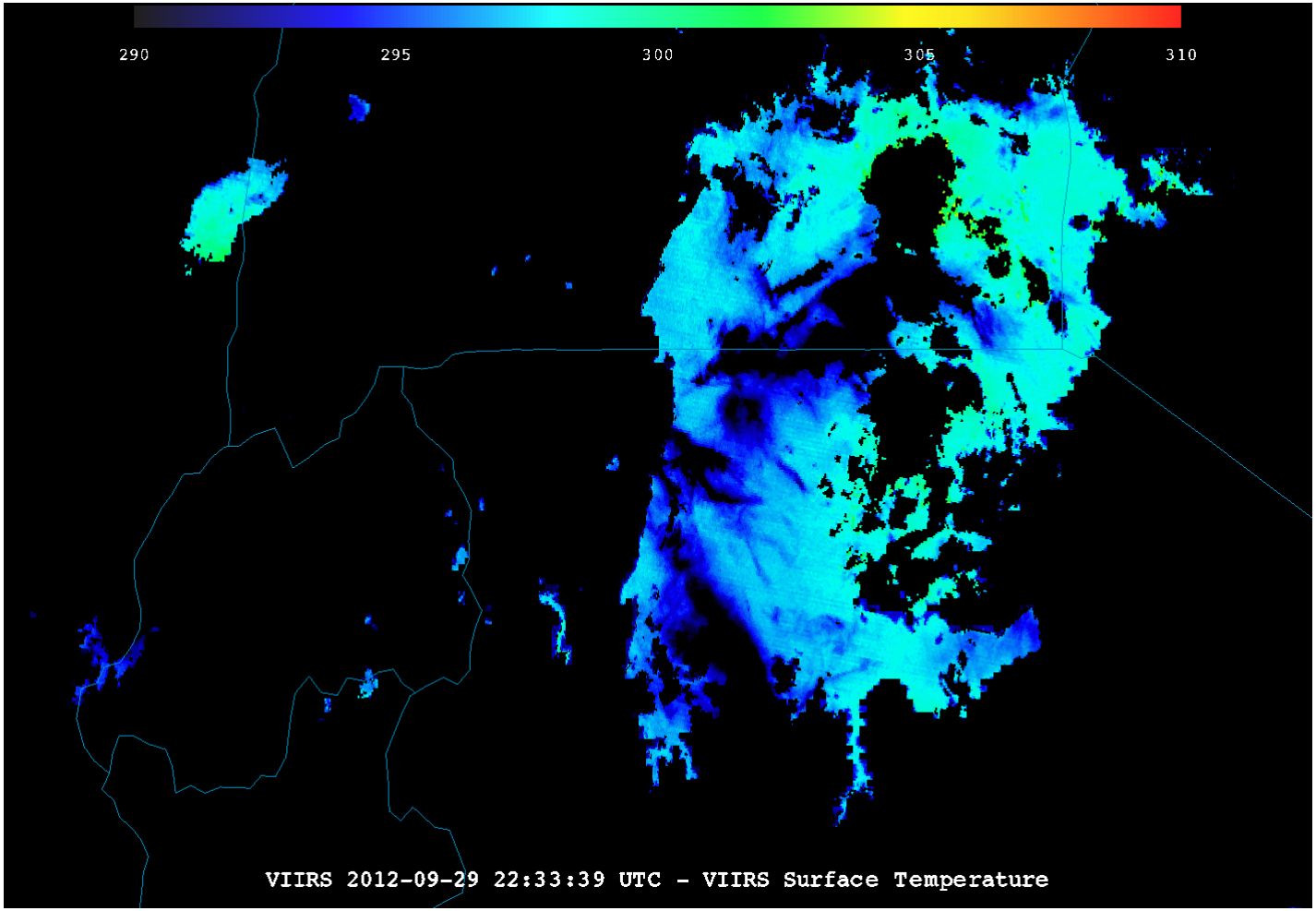
VIIRS SDR
Ancillary data



Visible Infrared Imaging Radiometer Suite (VIIRS) EDR

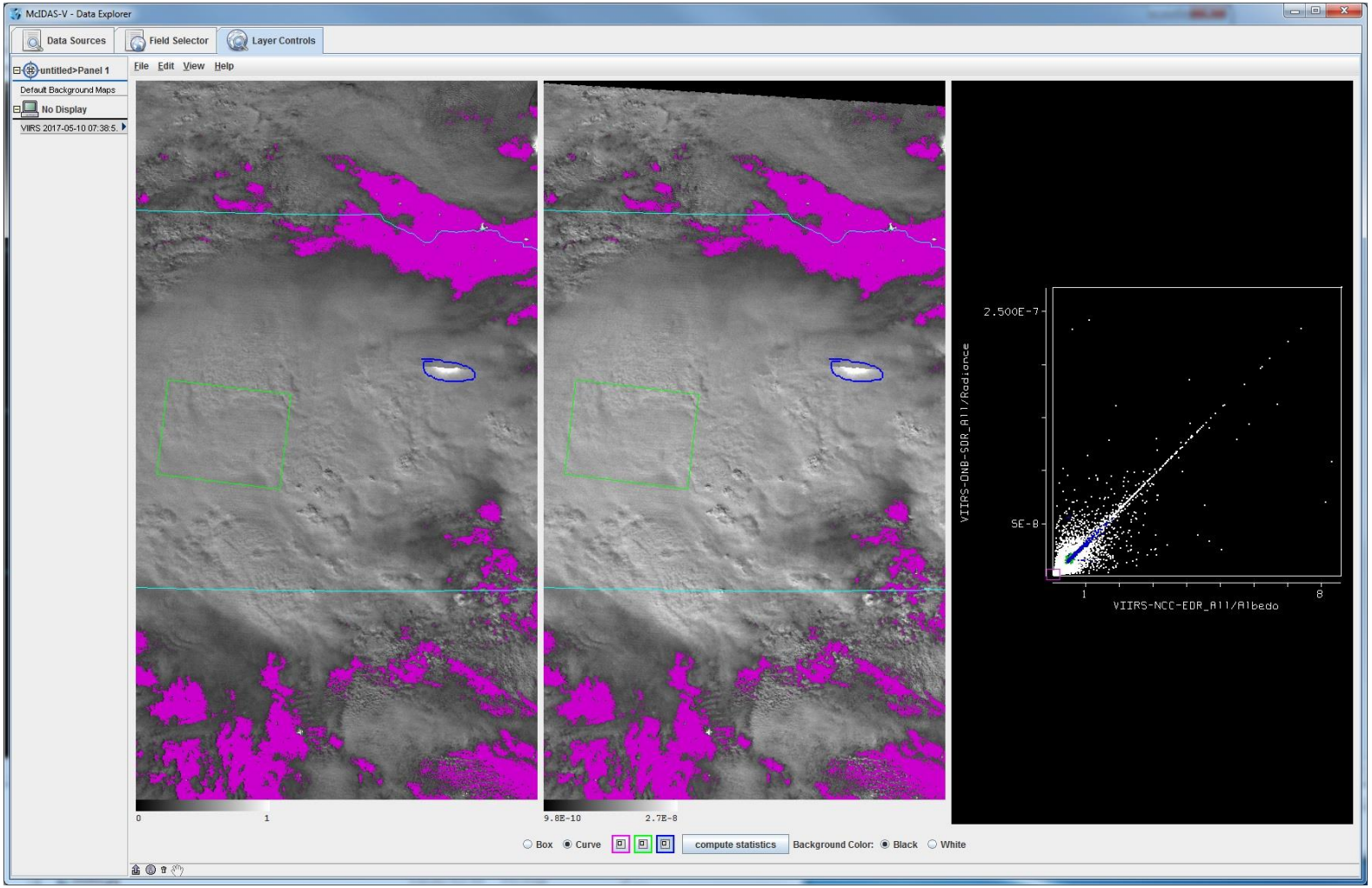
- There are a series of 20 Environmental Data Records (EDRs) produced from VIIRS from the IDPS
  - These algorithms are being migrated to the Enterprise algorithms
- McIDAS-V has been able to successfully ingest all EDRs including NDE Enterprise output
- McIDAS-V can unpack and display bit level data for IDPS data.
  - Ex. Displaying VCM test results
  - Will be working on unpacking bits for Enterprise algorithms

VIIRS DNB and Surface temperature EDR 2236Z, 09/29/2012

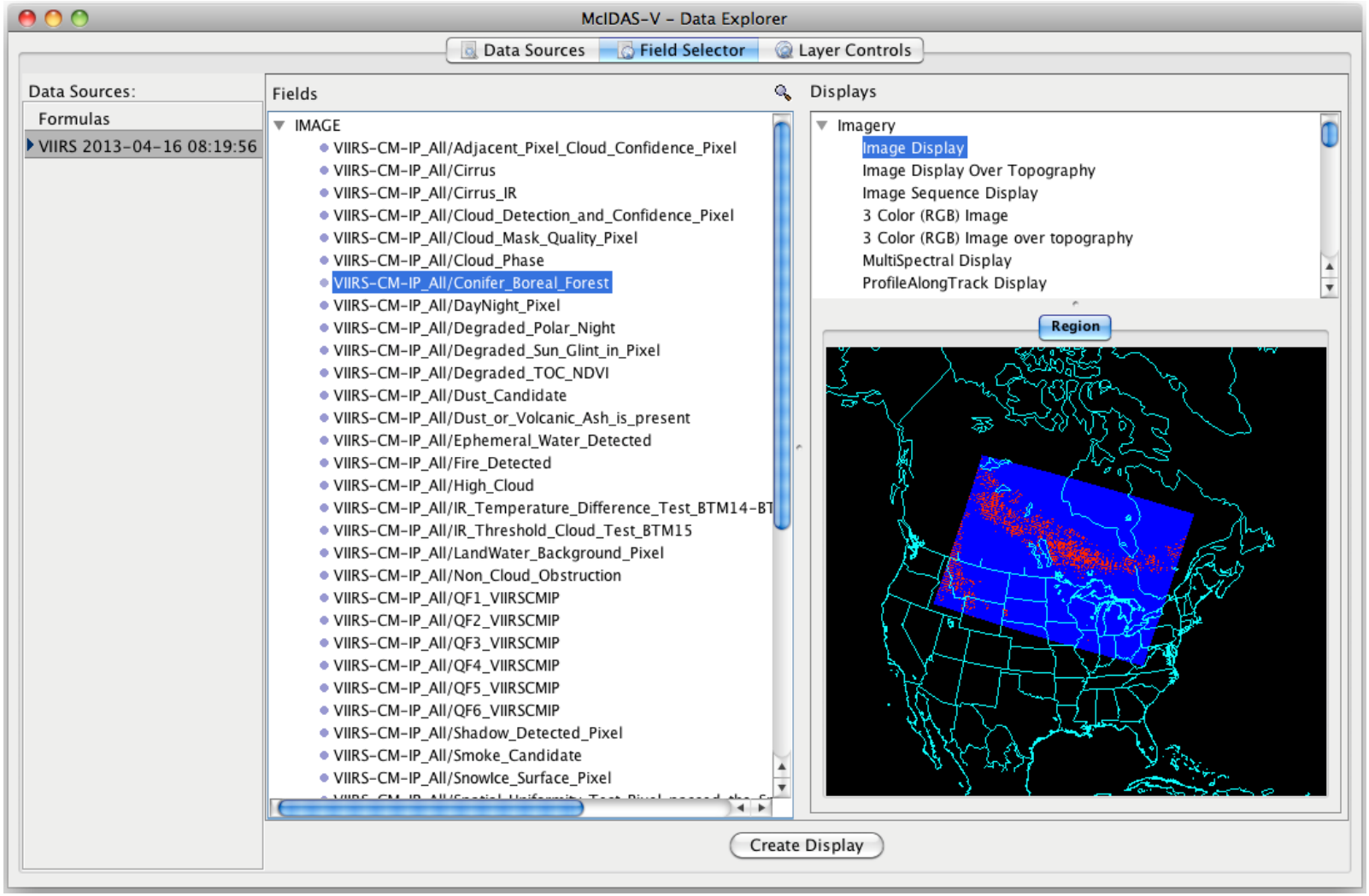


Lake Victoria

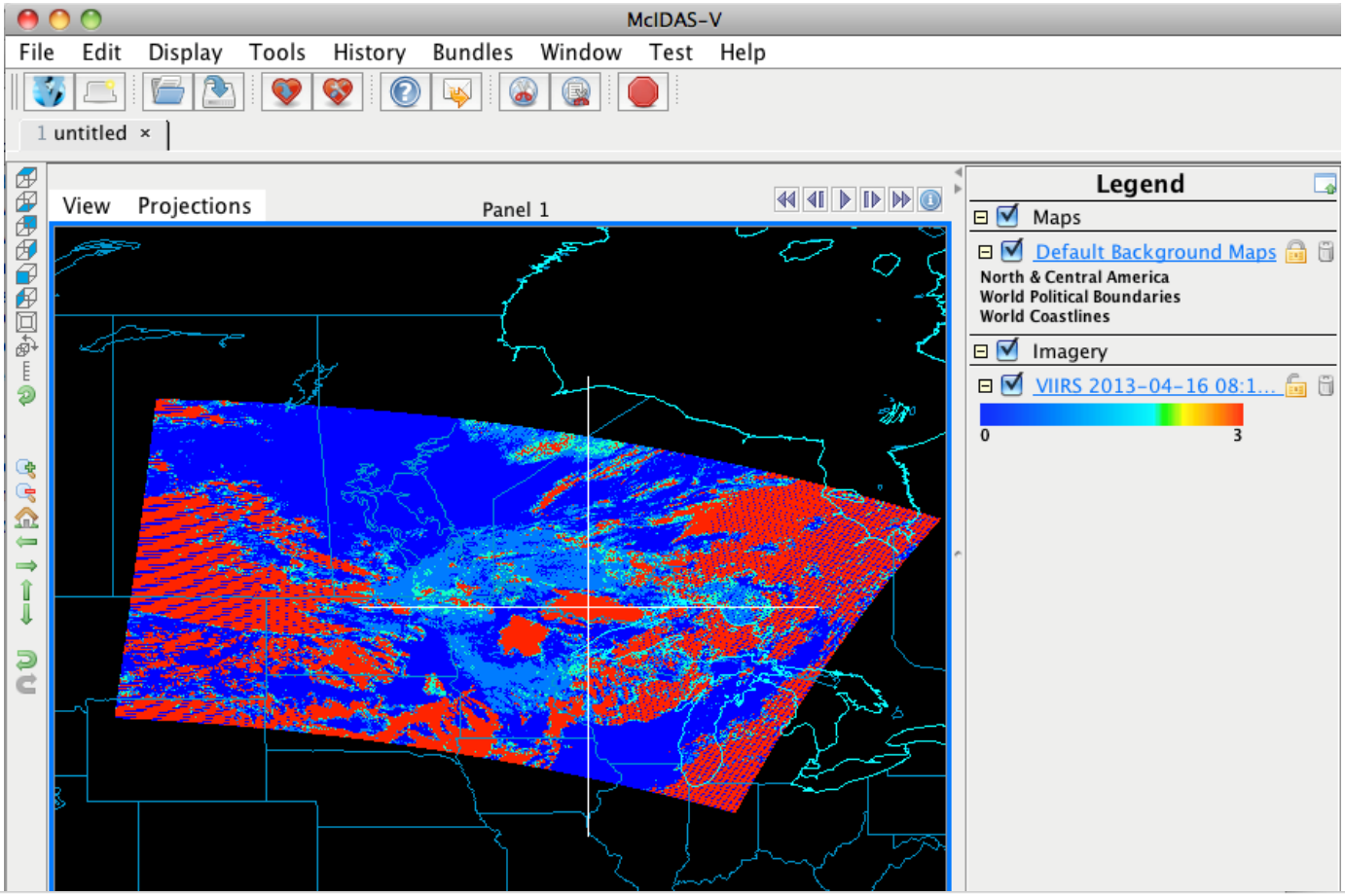
Imagery EDR example
Scatter analysis



Product EDR Variable selection



Product EDR Data Probe



S-NPP/NOAA-20 specific McIDAS-V 1.7 Updates

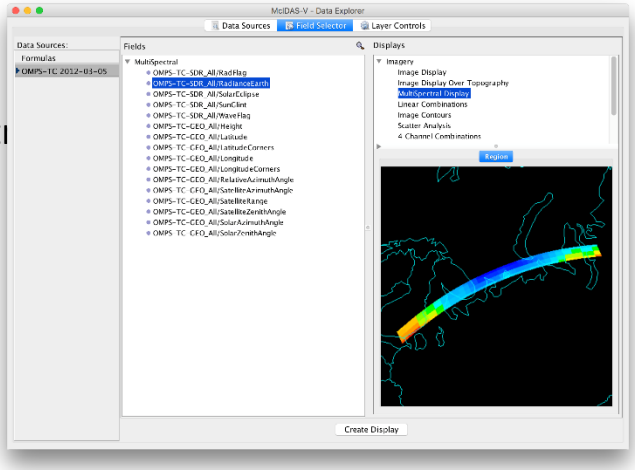
- Support for the VICMO cloud mask EDR (released March 2017) as well as backwards compatibility with IICMO data.
- Added a new "show variables" button to the Field Selector tab of the Data Explorer which can show the variable shortname or (if present) long name.
- VIIRS Formulas plugin that gives formulas to remove the bowtie deletion and create RGB displays without the bowtie
- Added several VIIRS specific Scripting functions to load and grab information and create RGBs from SNPP/J1 files.
  - Example – “True color” RGB function (http://mcidas.ssec.wisc.edu/forums/viewtopic.php?f=31&t=1912&sid=e0bc1d9c9ac28f776ab6669136d75e1c)

S-NPP/NOAA-20 Updates since McIDAS-V 1.7 in Nightly Build

- Support added for CrIS Full Spectrum data.
- Chooser rename to JPSS (it's not just for Suomi any more!)
- Reordering of fields provided now (e.g. M bands used to be listed out of order in multibanded VIIRS files)
- Better time formatting in scripting functions
- Generalization and renaming of scripting functions, with deprecation warnings provided

Needed features for JPSS activities

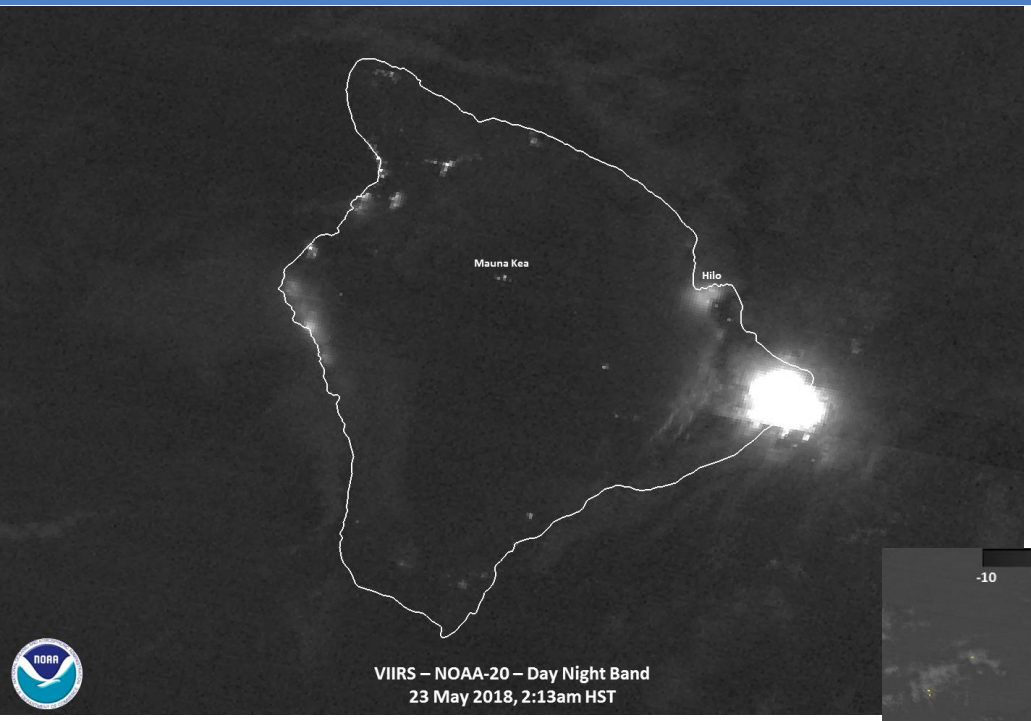
- Support for visualizing granules which straddle the dateline (note, this issue occurs with other polar and geo data)



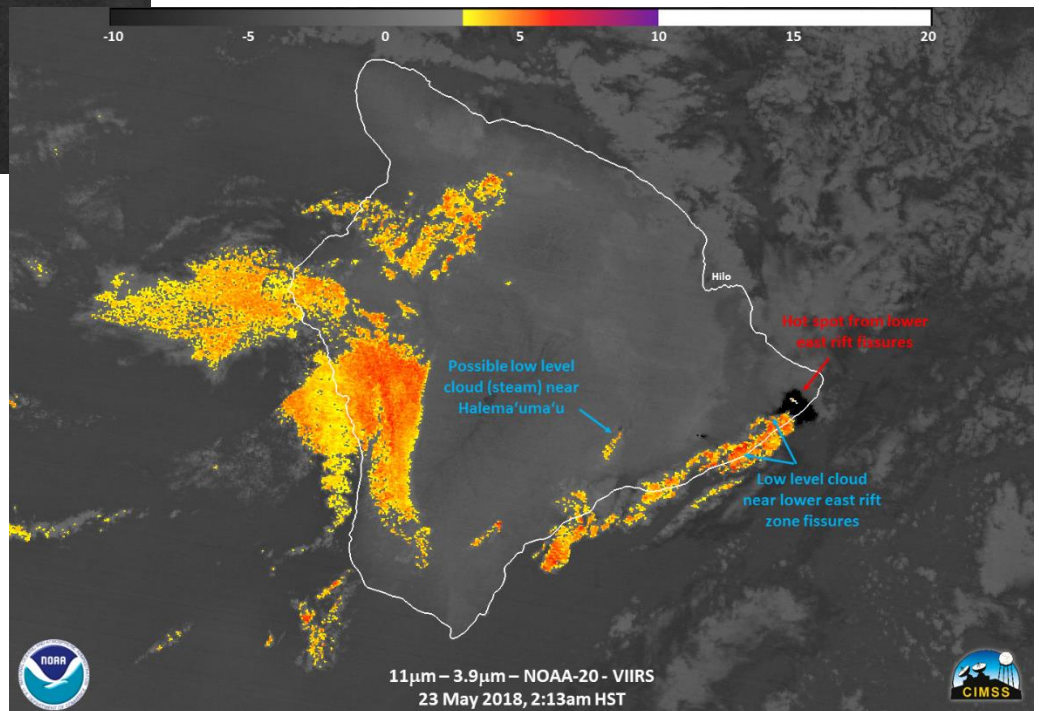
- Support for OMPS
  - Needed for comparisons and visualizations with other instr
  - Currently in testing
- Support for Active Fires products
- Support for NUCAPS
- Support for non-CF 3-D variables
- Output in other GIS-type formats (ex. geoTIF)
  - Google KML/KMZ files often either don't display properly in other GIS viewers other than Google Earth.
  - This is needed for comparisons and interactions with other groups, both in cal/val and other activities.

EXAMPLES OF MCIDAS-V USED FOR JPSS

NOAA-20
2018 lower Puna lava outbreaks

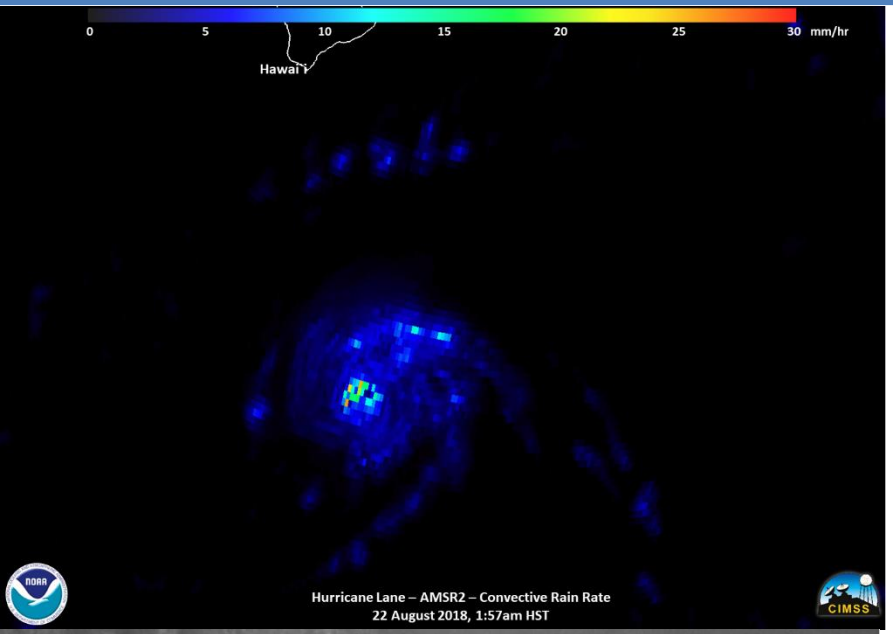


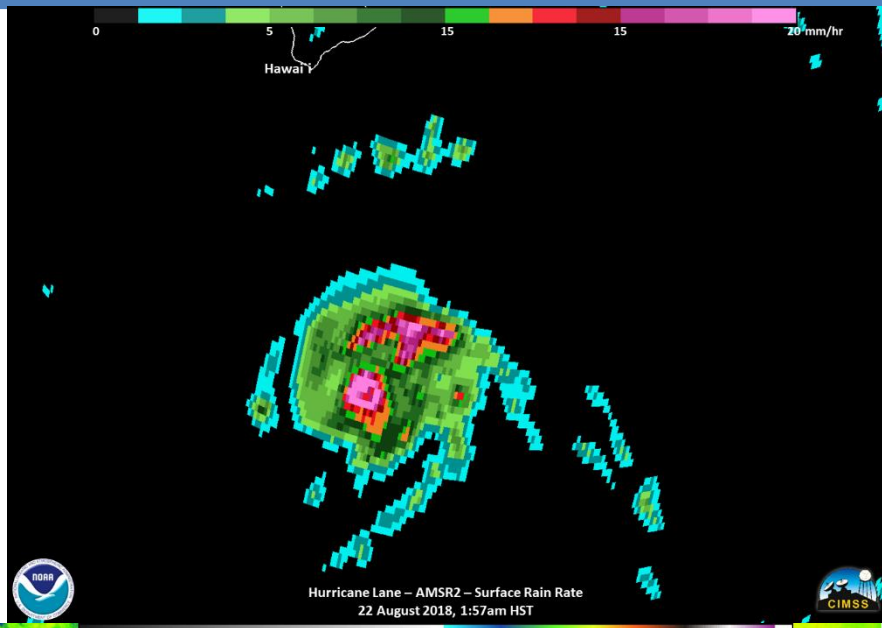
VIIRS – NOAA-20 – Day Night Band
23 May 2018, 2:13am HST

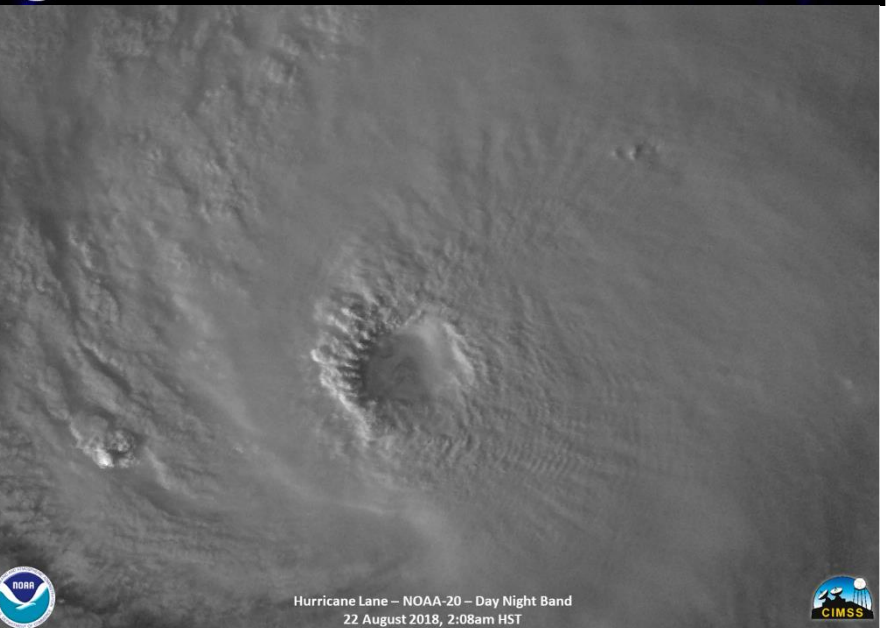


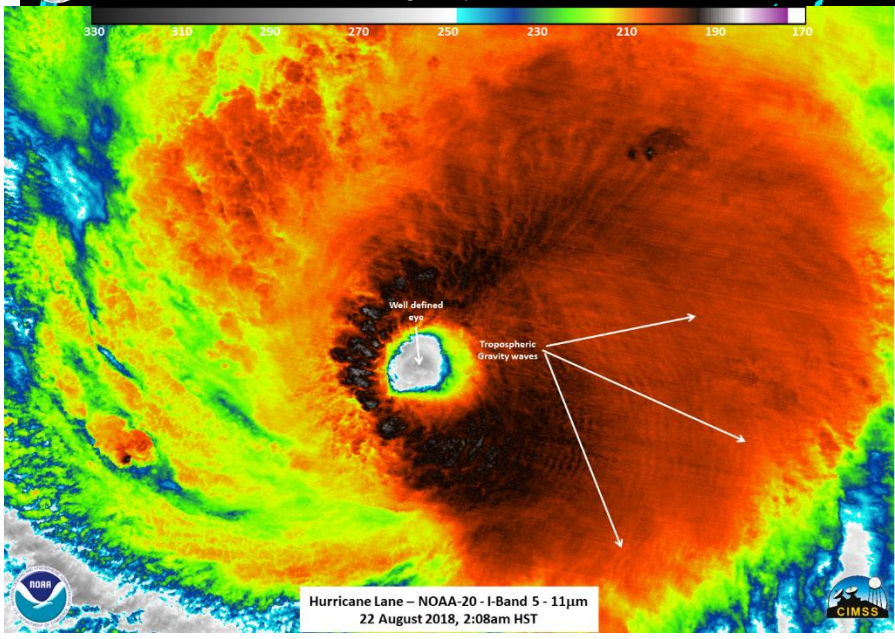
11μm – 3.9μm – NOAA-20 - VIIRS
23 May 2018, 2:13am HST

NOAA-20
Hurricane Lane

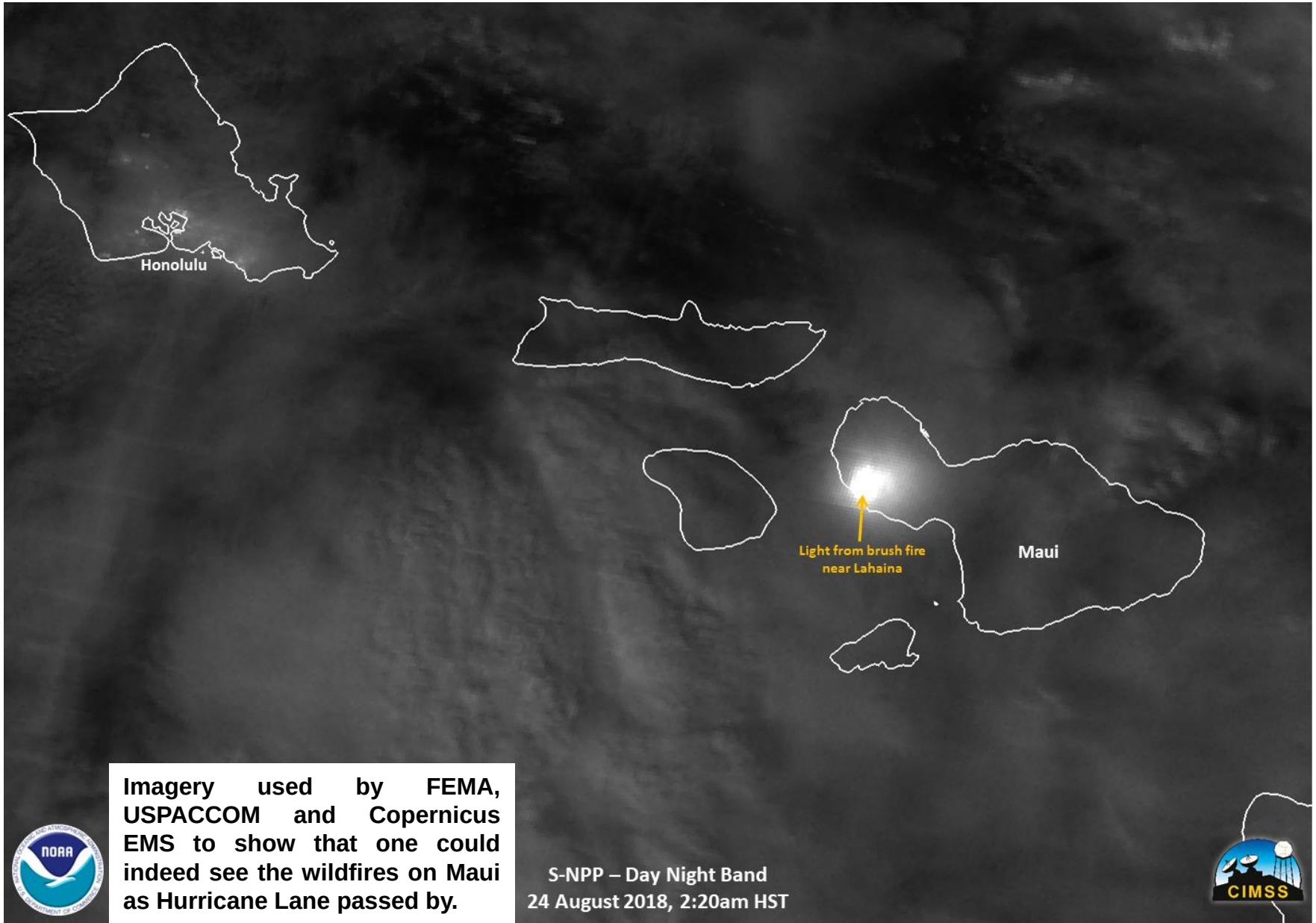








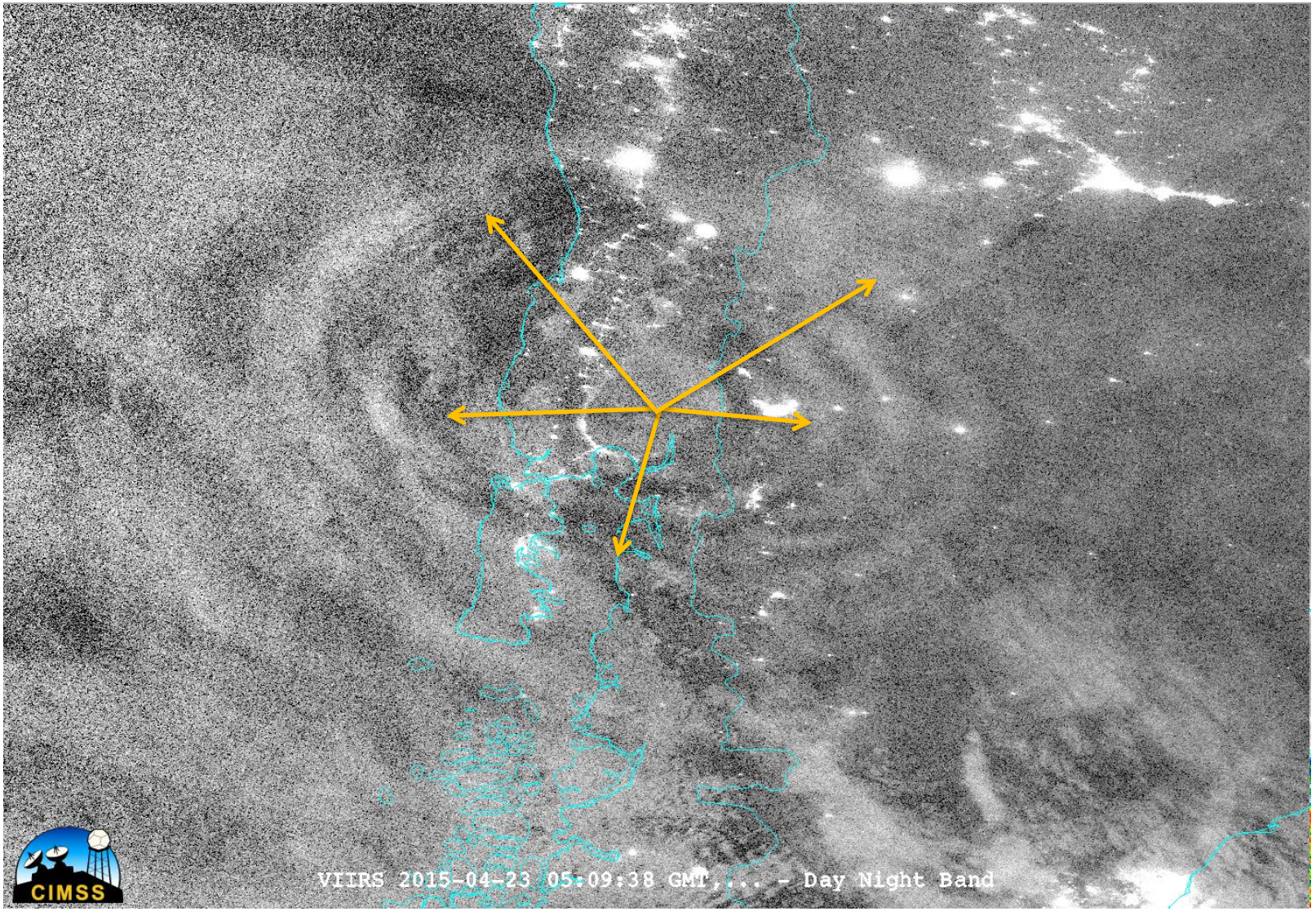
S-NPP
Hurricane Lane



Imagery used by FEMA, USPACCOM and Copernicus EMS to show that one could indeed see the wildfires on Maui as Hurricane Lane passed by.

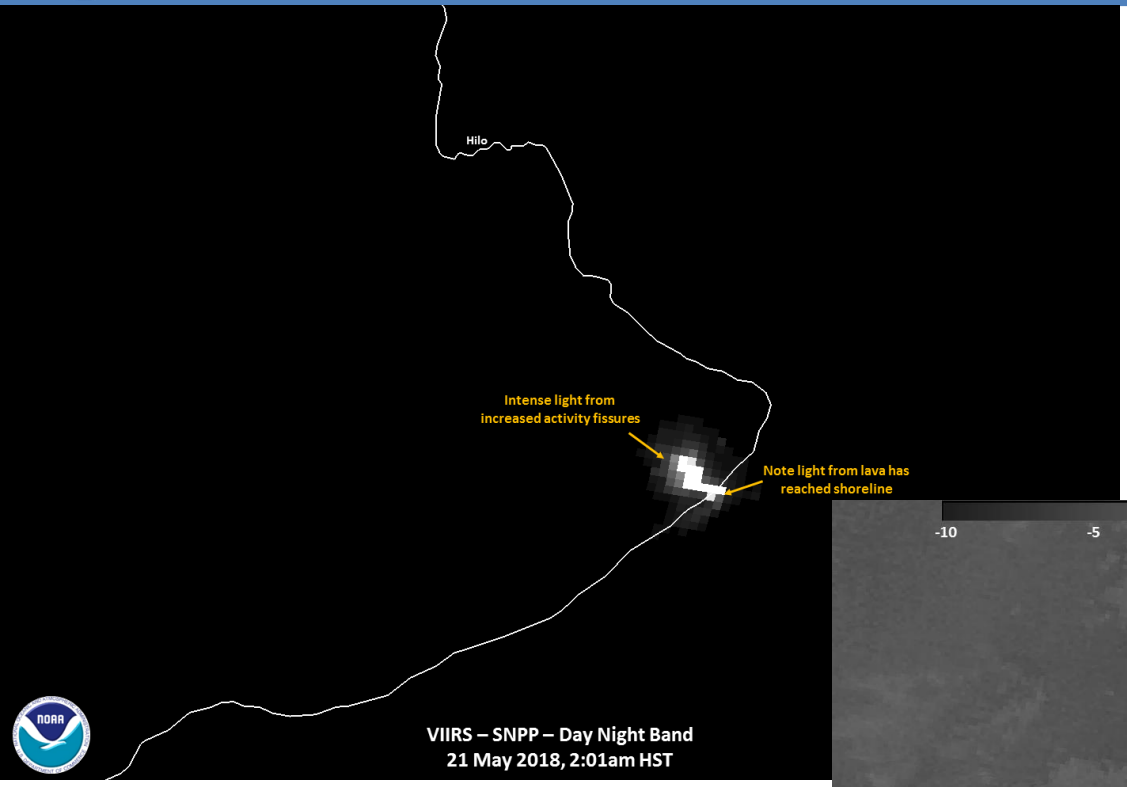
S-NPP – Day Night Band
24 August 2018, 2:20am HST

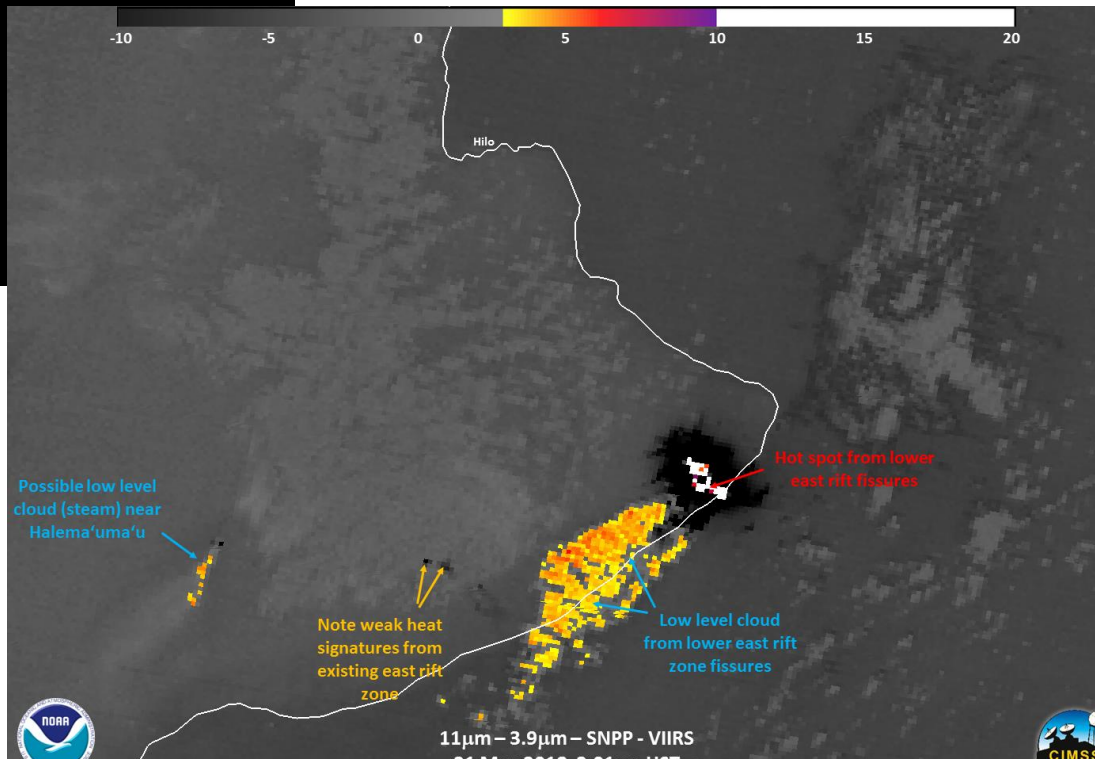
Mesospheric Gravity Wave monitoring



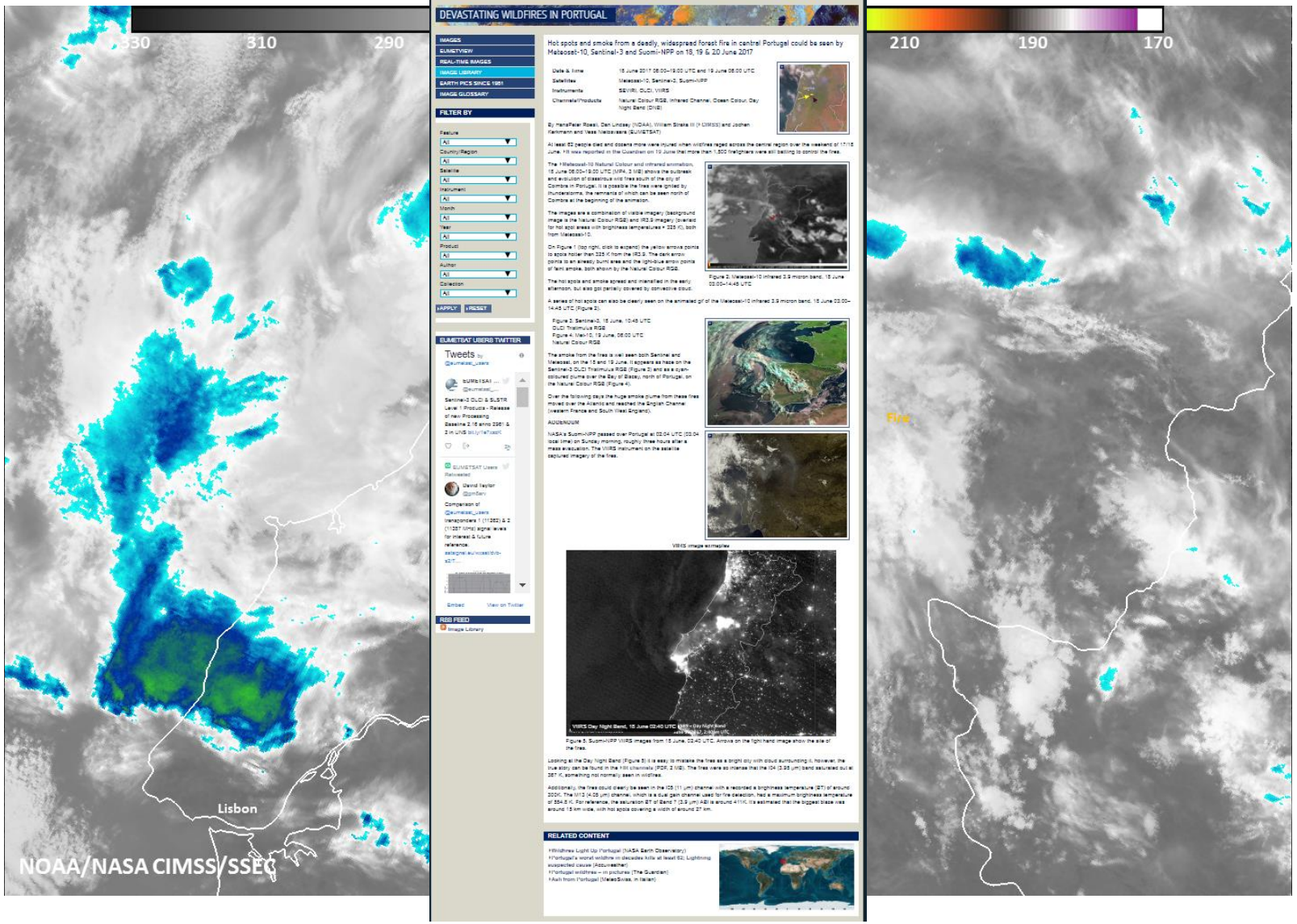
EXTRA SLIDES

SNPP
2018 lower Puna lava outbreaks



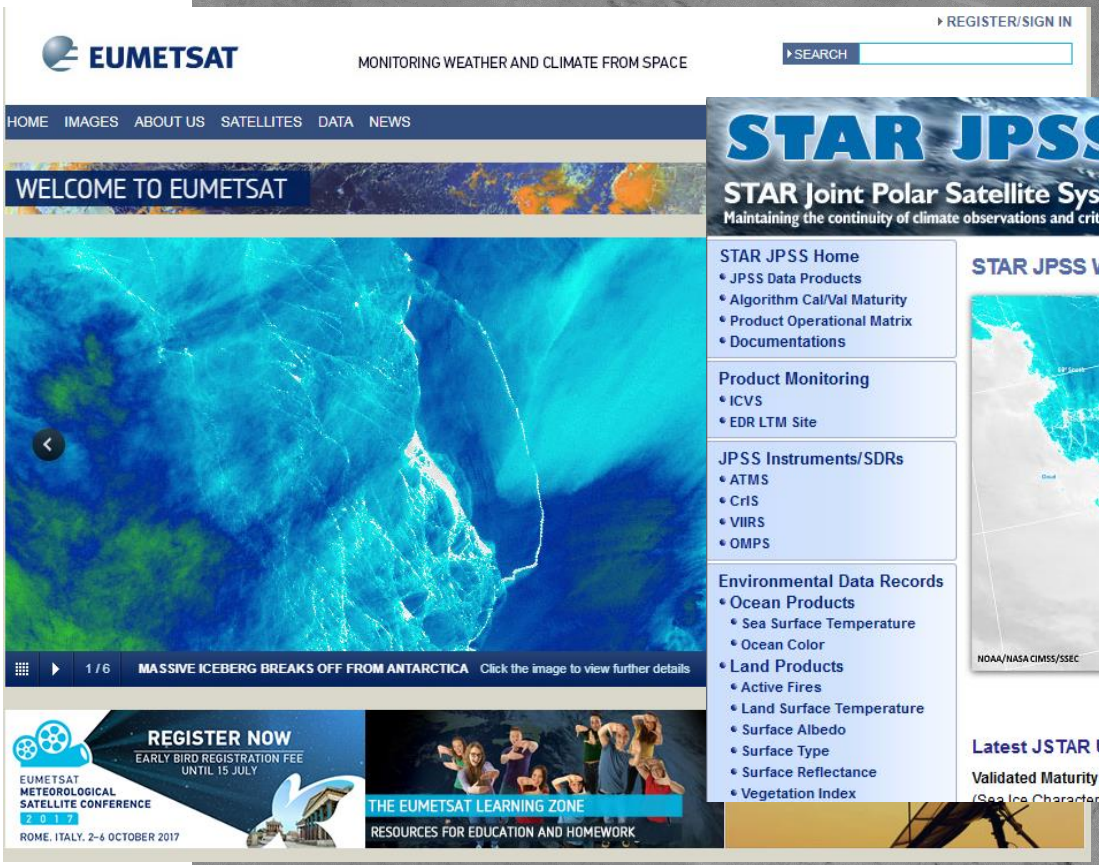


Disaster monitoring
Fires and Smoke support



https://www.eumetsat.int/website/home/Images/ImageLibrary/DAT_3524803.html

Polar Monitoring Public Outreach



NOAA/NASA CIMSS/SSEC

VIIRS – Day Night Band
12 July 2017, 0326 UTC